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WATER RESOURCES OFFICE

Honourable D. A. Ure - Minister

Ben Russell - Director

POSSIBLE DIVERSION FRON THE ARCTIC WATERSHED TO THE SASKATCHEWAN (HUNDSON'S BAY) DRAINAGE BASIN.

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August 22nd, 1951.

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INTRODUCTION

There are three general ways in which water can be controlled to extend its use in a particular area. So far as the use of water in the Saskatchewan River Basin is concerned, this may be accomplished as follows:

(1) By storing excess flood water for use when supplies are low.

(2) By finding new sources from streams that are not being fully utilized within the Saskatchewan Basin.

(3) By diverting water from other drainage basins into the Saskatchewan basin.

The continued expansion of the use of water from the South Saskatchewan River basin for irrigation purposes, coupled with the demands of the Province of Saskatchewan and Manitoba for the preservation of their share of these waters, will lead inevitably to a search for other sources of supply.

With this in mind a reconnaissance has been made to examine the possibility of diverting water from the Arctic Drainage basin into the Saskatchewan (Hudson's Bay) watershed.

POSSIBLE DIVERSION FROM THE ARCTIC WATERSHED TO THE HUDSON BAY WATERSHED IN ALBERTA

In Report #19 entitled the "Geology of the area between the North Saskatchewan and the McLeod Rivers", Dr. R. L. Rutherford points out that Chip Lake, Isle Lake, Wabumun Lake and Lac Ste Anne, may be remnants of a much larger lake or lake systems which included them all.

It would seem that any proposal to divert water from the McLeod and Pembina Rivers in Alberta must revolve around the central thought. It seems obvious that any diversion system would encounter less physical handicaps along such a route and at the same time could utilize such portions of the lake remnants for storage. It may be mentioned here that storage possibilities on the headwaters of these streams is very limited.

The Pembina River has eroded a channel 200' deep through this ancient stream or lake system and this indicates that a major dam would be required on the Pembina near Entwistle. This dam would not only divert the Pembina in an easterly direction to Wabumun or Isle Lake, but would also serve as a"bridge" for waters of the Lobstick, Wolf and McLeod Rivers from the west. (see map)

While such a scheme would involve an expenditure of a large sum of money it is quite feasible from an engineering viewpoint.

It would also be quite feasible to divert the Pembina to the North Saskatchewan at some point further upstream where the stream gradient is much steeper. However, the value of the Pembina as a water source diminishes rapidly as we proceed up the stream. The McLeod which has its source at higher elevations is a more valuable and dependable water supply.

The approximate drainage basins involved are as follows:

Pembina River	-	1700 sq. miles
Lobstick River	-	500 sq. miles
Wolf River	-	400 sq. miles
McLeod River	-	1900 sq. miles
Total		4500 sq. miles.

The approximate average annual runoff from this area would be 2,250,000 acre feet. This amount of water would go a long way to make up for water diverted from the Saskatchewan for irrigation purposes.

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Headwater storage on the rivers mentioned is not very impressive and this further emphasizes the need to utilize the lake system referred to above.

Important Elevations Along Route of Proposed Diversions:

W. L. McLeod River south of Edson	2900
Wolf Creek Sta.	2858
Rosevear Sta.	2838
Peers Sta.	2787
Carrot Creek Station	2769
Niton Sta.	2737
Chip Lake	2581
F.S.L. Prop. dam on Pembina	2480
Divide near railway (35-53-7-5)	2480
Wabumun Lake	2381
Isle Lake	2392

From the above elevations it would seem that some water power possibilities exist. In addition some amelioration from flooding along the Pembina may result but there may be some confliction in attempting to make a multiple purpose project out of the scheme.

The terrain through which the canal would pass bears evidence of glacial action and is relatively uniform and presents no major obstacle from an engineering viewpoint.

Beginning at the west the major features would be:

(1) A dam on the McLeod River.

(2) A canal from the McLeod River dam to the Wolf River.

(3) A dam on the Wolf River

(4) A canal from the Wolf River to the Lobstick River.

(5) A natural channel through Lobstick River and Chip Lake.

(6) A diversion structure on the Lobstick.

(7) A canal from the Lobstick to a dam on the Pembina.

(8) A dam on the Pembina in a sandstone canyon near Evensburg.

(9) A canal from the Pembina River dam over a divide into either Isle Lake or Wabumun Lake. An outlet in Isle Lake would bring the water into the Sturgeon River which empties into the North Saskatchewan below Edmonton. An outlet in Wabumun Lake would bring the water into the North Saskatchewan above Edmonton.

It is considered that the adverse effect on northern navigation by this diversion would be very small and it might well be that it could be operated to improve navigation by the release of impounded water during low water periods. The main stream of the Athabasca is not affected by the diversion.

Considerable study would be necessary to determine the exact amount of water that could be diverted by this proposal but it would be very large. The limiting factor is that of the capacity of the diversion canal, but even a rough estimate would indicate that a million acre feet of water could be transferred from the Arctic to the Hudson Bay.

The proposal is by no means a new idea and it is reported that some 40 years ago a visionary engineer prepared a plan showing a ship canal between Edmonton and Edson following the general route outlined above.

Two factors will tend to focus more and more interest in the proposal. The first is the scheme to divert water from the North Saskatchewan River to the Red Deer for irrigation in the Hanna area and the other is the rapid growth of the city of Edmonton with consequent increase in water consumption.

Considerable storage could be created in Chip, Isle, Ste. Anne, Wabumun and Big Lakes.

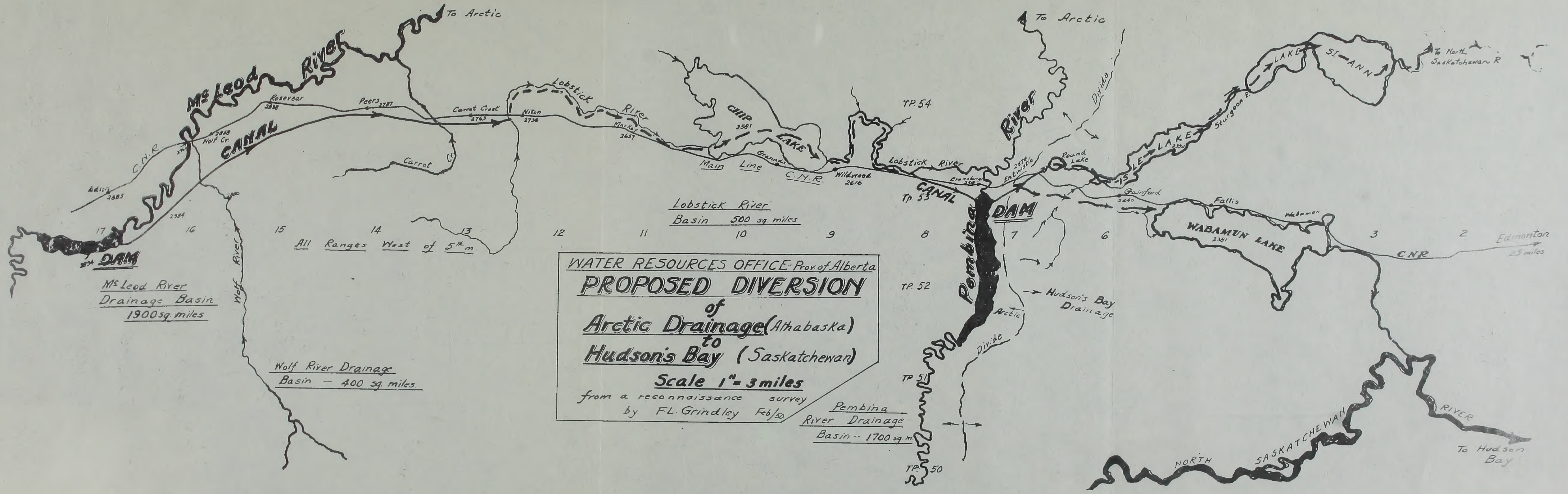
It may seem rather silly to talk about irrigation in the Edmonton area, but in this connection it is noted that there is a steady growth in sprinkler irrigation in the Edmonton area at the present time. A portion of the McLeod-Pembina water may be used in this district for market gardening.

The matter of sewage dilution is becoming very important below Edmonton even now. Something will need to be done in the near future to correct this situation.

The Prairie Provinces Water Board has recently started to establish allocations of water from the Saskatchewan River in order to ensure that all of the western Provinces will have a fair share of the available supply. When these allocations are established they will represent recognition in perpetuity of a right to the available water.

Consumption of water to sustain human beings and livestock has top priority.

The day will come when diversions of water for extraneous purposes will be limited to available supply. If the supply can be increased by the proposal herein described considerably expansion of the use of water for industrial and irrigation purposes will be realized.



WATER RESOURCES OFFICE - Prov. of Alberta

PROPOSED DIVERSION
of
Arctic Drainage (Athabaska)
to
Hudson's Bay (Saskatchewan)

Scale 1" = 3 miles
from a reconnaissance survey
by F.L. Grindley Feb/50

DATE DUE

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